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Cloning, expression and characterization of thermostable L-asparaginase from *Bacillus amyloliquefaciens* B15

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Statement of the Problem: Acrylamide is a probable human carcinogenic compound formed by Maillard reaction between reducing sugars and asparagine. It is usually produced in deep-frying starchy food at over 120°C. The formation of this is possible to get reduced by an enzyme, L-asparaginase. It is found in various microorganisms and used for commercial products in food industry. But, it still has a limit for industrial application due to deactivation of the enzyme during thermal processing. Thus, thermostable property of L-asparaginase is an important issue for its application in food industry. In this study, we produced and characterized thermostable L-asparaginase from *Bacillus amyloliquefaciens* B15, newly screened from Korean fermented soybean paste. Methodology & Theoretical Orientation: RBAM RS01510 gene, encoding the thermostable L-asparaginase II-like gene from *B. amyloliquefaciens* B15 (B15-Asp), was cloned and expressed in *Escherichia coli* BL21 (DE3). And its recombinant L-asparaginase was purified and characterized. Findings: The recombinant enzyme (B15-Asp), purified by one-step procedure using nickel-affinity chromatography, showed asparaginase activity of 5.78 IU/mg and its molecular weight was about 35 kDa determined by SDS-PAGE. The optimum pH and temperature for B15-Asp activity were

10.0 and 65, respectively. The enzyme was stable at almost all pH ranges for 5 h incubation. And the enzyme exhibited about 92% retention of its activity for 10 h incubation at 95. Conclusion & Significance: The results of this study reveal that L-asparaginase from *B. amyloliquefaciens* B15 can be useful to thermal food and industrial processing as an acrylamide reducer due to its outstanding stability at high temperature and the wide pH ranges.



Figure 1: Production of acrylamide and its inhibition by L-asparaginase

Biography

She has professional experience with bacterial fermentation, enzyme utilization, new ingredient development and industrial application in food science areas. She has published more than 50 papers in reputed journals and has served as an editor of Applied Biological Chemistry and Preventive Nutrition and Food Science.

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